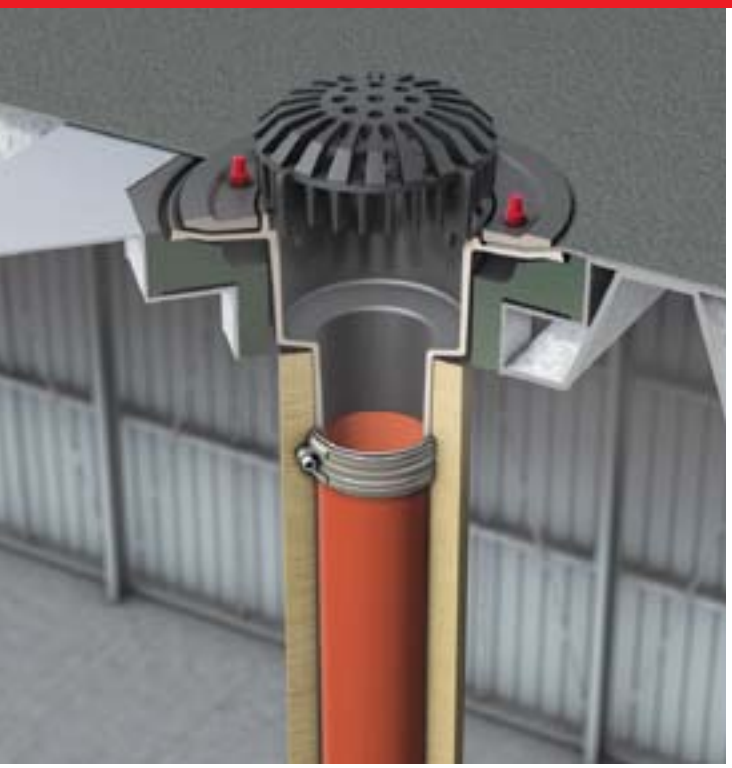
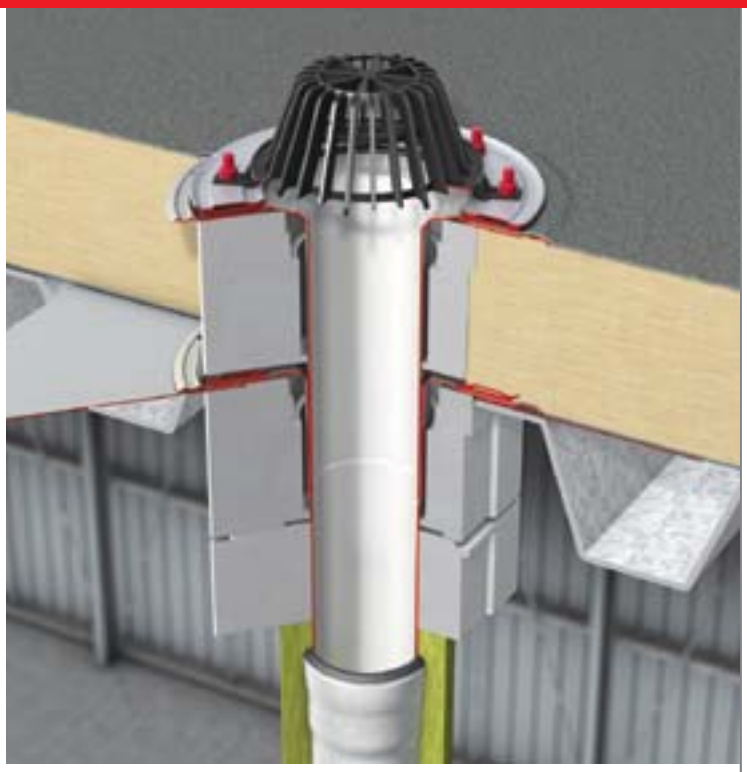
Gravity drainage





Calculating the number of flat roof drains and emergency roof drains required for gravity drainage systems

The following parameters are specified in DIN 1986-100 (version May 2008) Chapter 14.2.1, to calculate the number of drains required for a flat roof drainage system:

- The size of the effective roof in square metres (A)
- Type of roof – flow coefficient (C)
- Local reference rainfall in litres/second and hectare l/(s∗ha) ($r_{(D,T)}$)

Effective roof area

In accordance with DIN 1986-100, Chapter 14.2.4.1, calculating the effective roof area must be based on the roof area projected onto the floor plan.

Flow coefficient

The flow coefficient (C) is determined by the type of roof to be drained. This is selected from Table 9 in DIN 1986-100. The following is a short extract:

Type of drained area	Flow coefficient (C)
Membrane roof	**1.0**
Concrete roof	**1.0**
Gravel roof	**1.5**
Extensive greening < 10 cm layer	**1.5**
Extensive greening exceeding 10 cm layer	**0.3**
Intensive greening	**0.3**

Reference rainfall

The variable reference rainfall $r_{(D,T)}$ consists of two parameters:

D = rainfall duration in minutes
T = annuality of the reference rainfall

The reference rainfall for flat roof drainage systems is based on a rainfall period of 5 minutes and an annuality of five years.
Calculations therefore refer to a reference rainfall of $r_{(5,5)}$.

The relevant reference rainfall for rainwater drainage in gravity drainage systems $r_{(5,5)}$ is taken from KOSTRA/DWD 2000/[1] in accordance with the specific location. It is forbidden to use the value for emergency drainage $r_{(5,100)}$.

Abbreviations are explained as follows:

Reference rainfall	Duration of the rainfall event	Annuality of the rainfall event	Application
$r_{(5,5)}$	5 minutes	Every 5 years	Rainfall discharge for gravity drainage systems
$r_{(5,100)}$	5 minutes	Every 100 years	Rainwater discharge for emergency drainage systems

Calculating the rainwater drainpipes

- Downpipes

DIN 1986-100, Section 14.2.7.2 specifies that the nominal widths of the downpipes must not be smaller than the connected nominal width of the associated flat roof drain or the collective connecting line. The rainwater downpipes can be calculated with a level of fill up to f = 0.33. Downpipes with inclines ≥10° are ignored when calculating the drainage capacity.
In the case of inclined drainpipe sections with gradients of <10°, the dimensions of the rainwater downpipes must be calculated using the gradient of the inclined section and a level of fill of h/d1 = 0.7.

- Single and connective connecting lines

DIN 1986-100, Section 14.2.7.1 specifies that single connecting pipes must be dimensioned in the same way as collective connecting pipes. However, the nominal width of the pipes must not be smaller than the nominal width of the flat roof drain. In addition, collective connecting pipes must be dimensioned in the same way as connecting lines.

- Connecting lines and buried pipes

DIN 1986-100, Section 14.2.7.3 specifies that the minimum diameter of buried pipes must be DN 100. The dimensioning of buried pipes outside of buildings must take into account a minimum flow rate of v = 0.7 m/s and a maximum flow rate of v = 2.5 m/s. The minimum gradient must be 1:DN. The limit for the level of fill h/d1 is 0.7. Caution: collecting pipes and buried pipes within buildings must be dimensioned with a level of fill of h/d1 = 0.7 taking into consideration a minimum gradient of 0.5 cm/m.

[1] **KO**ordinierte **ST**arkniederschlags-**R**egionalsierungs-**A**uswertungen des Deutschen Wetterdienstes, Bezug: CD-Rom über ITWH, Hannover. Im Anhang A von DIN 1986-100 befindet sich ein Auszug mit Regenspenden für wichtige deutsche Städte.

Calculation example

Flat roof drain for gravity drainage system

A gravity rainwater drainage system for a flat roof is planned for a large warehouse in Rosenheim/Germany. The roof will have an effective area of 1300 m² and is designed as an air-insulated roof with a gravel cover. Six buried pipeline connections are available to drain the roof.

The dimensioning figures for the rainwater drainage are selected in accordance with the parameters.

These are:

- Effective roof area (A) = 1.300 m²
- Flow coefficient (C) for gravel covered roof = 0.5 in Table 9 pursuant to DIN 1986-100
- Reference rainfall $r_{(5,5)}$ for Rosenheim pursuant to KOSTRA-DWD = 452 l/(s)* ha

These figures are input into the following formula to calculate the rainwater flow capacity:

Reference rainfall $r_{(5,5)}$	x	flow coefficient C	x	effective roof area A	/	10.000	=	rainwater flow capacity Q
452	x	0,5	x	1.300	/	10.000	=	29,38 l/s

Preliminary considerations for selecting the flat roof drains

Because the downpipes can be connected directly to the flat roof drains, vertical downpipes will be used. Gravel baskets are required to optimally drain the rainwater from the gravel roof. Drain bodies only require one compression-sealing flange because the roof is air-insulated with only one sealing membrane. These considerations and calculations lead to the selection of the ACO Spin flat roof drain DN 100 made of stainless steel with a stainless steel gravel basket. According to the specifications table (see page 15) the flat roof drain has an outflow capacity of 5.6 l/s.

The number of flat roof drains required is calculated from the rainwater outflow divided by the outflow capacity of the flat roof drain:

Rainwater flow capacity Q	/	outflow capacity of the selected flat roof drain	=	number of flat roof drains required
29,38	/	5,6	=	5,246 drains

Discussion of the results

The calculated figure of 5.246 is rounded upwards. 6 flat roof drains are required for the proper drainage of the roof. Consideration also has to be given to the outflow capacity of the drainpipes (see Fig. 26 from DIN 1986-100 or Table 8 from DIN EN 12056-3).

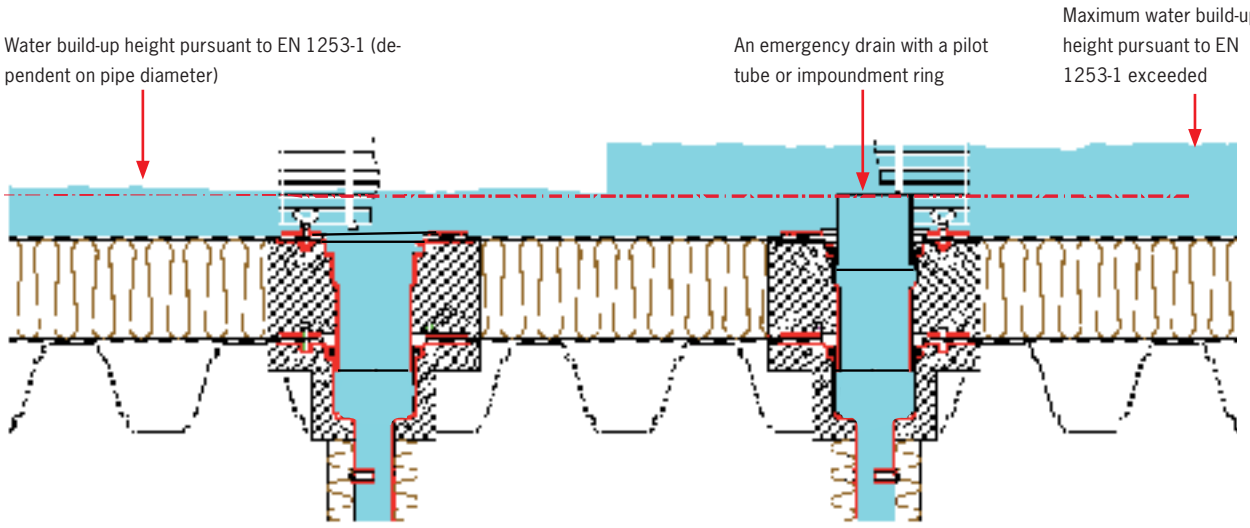
The DN 100 downpipes can be assigned a degree of fill of f = 0.33 according to this table. This corresponds to an outflow capacity per pipe of 10.7 l/s.

Emergency drainage

The water build-up heights required for flat roof drains for gravity drainage and the associated emergency drains are specified in EN 1253-1, Table 10. The water build-up heights for nominal widths of DN 70 – DN 150 are as follows:

Nominal width	Maximum water build-up height
DN 70	35 mm
DN 100	35 mm
DN 125	45 mm
DN 150	45 mm

Water build-up height example
The maximum water build-up height for a DN 150 flat roof drain is 45 mm.
The emergency drainage system is ctivated when this height of 45 mm is exceeded. The maximum water build-up height at the emergency drain is again 45 mm pursuant to Table 10 in EN 1253-1. This means that the maximum water build-up height for the emergency drain is reached when the water level rises to 90 mm.



The reference rainfall for the emergency drainage Q_{Not} is calculated using the following formula:

$$(r_{(5,100)} - r_{(5,5)} \times C) \times \frac{A}{10.000} = Q_{Not}$$

Caution: note that the reference rainfall $r_{(5,5)}$ first has to be multiplied by the flow coefficient C before deducting the result from the reference rainfall for the one hundred year rainfall event $r_{(5,100)}$.

The emergency drainage system on its own should be capable of draining the 100-year rainfall if a building requires an unusual degree of protection (cf. EN 12056-3: 2001-01, Table 2).

Calculation example

Emergency drainage for a gravity drainage system

A gravity rainwater drainage system for a flat roof is planned for a large warehouse in Rosenheim/Germany. The roof will have an effective area of 1300 m² and is designed as an air-insulated roof with a gravel cover.
The dimensioning figures for the rainwater drainage are selected in accordance with the parameters. These are:

- Effective roof area (A) = 1.300 m²
- Flow coefficient (C) for gravel covered roof = 0.5 in Table 9 pursuant to DIN 1986-100
- Reference rainfall for 100-year rain $r_{(5,100)}$ für Rosenheim pursuant to KOSTRA-DWD = 853 l/(s*ha)

This value is incorporated in the following formula to calculate the rainwater flow capacity.

$$(853 - 452 \times 0{,}5) \times \frac{1.300}{1.0000} = 81{,}51 \text{ l/s}$$

The Spin DN 100 Attika roof drain made of stainless steel (Article No. 0174.78.24) is selected for the emergency drainage in this example. The outflow capacity of this drain is 6.0 l/s according to DIN.

The number of flat roof drains required is calculated by dividing the rainwater flow capacity for the emergency drainage Q_{Emer} by the outflow capacity of the selected parapet roof drain:

Rainwater flow capacity for emergency drainage	/	Outflow capacity of a selected flat roof drain	=	Number of flat roof drains required
81,51	/	6,0	=	13,58 drains

Explanation of the results

The calculated figure of 13.58 is rounded upwards. This means that 14 emergency drains are required to properly drain the roof area. To ensure that the volumes of water which have to be drained during an emergency are transferred to the designated area, each parapet drain is drained by a separate pipe.

Outflow capacity

ACO Spin flat roof drains

The outflow capacities of the flat roof drains are dependent on the nominal width of the drain body, the type of grating used, the inclination of the pipes, and whether an upper part with a compression sealing flange is placed on top of the drain body. Make sure that the pipes used are properly dimensioned.

Cast Iron

DN 70

			Ball grating	Flat grating	Top section	Cast iron top section
Nominal width	**Inclination**	**Model**	**Article No. 7000.09.00**	**Article No. 7000.19.00**	**Article No. 5141.81.00 5141.87.00 5141.89.00**	**Article No. 5141.83.00**
DN 70	1,5°	Without upper part	6,0 l/s	5,4 l/s	5,2 l/s	4,8 l/s
DN 70	1,5°	With upper part	5,5 l/s	4,4 l/s	4,2 l/s	3,8 l/s
DN 70	90°	Without upper part	7,0 l/s	6,7 l/s	6,2 l/s	5,8 l/s
DN 70	90°	With upper part	6,5 l/s	5,7 l/s	5,2 l/s	4,8 l/s

DN 100

			Ball grating	Flat grating	Top section	Cast iron top section	Top frame with grating
Nominal width	**Inclination**	**Model**	**Article No. 7000.10.00**	**Article No. 7000.20.00**	**Article No. 7000.40.00**	**Article No. 7000.28.00**	**Article No. 7000.41.00 7000.42.00**
DN 100	1,5°	Without upper part	9,0 l/s	8,4 l/s	10,7 l/s	7,6 l/s	12,1 l/s
DN 100	1,5°	With upper part	9,0 l/s	8,4 l/s	10,7 l/s	7,6 l/s	12,1 l/s
DN 100	90°	Without upper part	8,0 l/s	6,2 l/s	10,7 l/s	7,6 l/s	15,2 l/s
DN 100	90°	With upper part	8,0 l/s	6,2 l/s	10,7 l/s	7,6 l/s	15,2 l/s

DN 125

			Ball grating	Flat grating	Top section	Cast iron top section	Top frame with grating
Nominal width	**Inclination**	**Model**	**Article No. 7000.10.00**	**Article No. 7000.20.00**	**Article No. 7000.40.00**	**Article No. 7000.28.00**	**Article No. 7000.41.00 7000.42.00**
DN 125	1,5°	Without upper part	12, 0 l/s	10,2 l/s	12,6 l/s	7,6 l/s	16,4 l/s
DN 125	1,5°	With upper part	12, 0 l/s	10,2 l/s	12,6 l/s	7,6 l/s	16,4 l/s
DN 125	90°	Without upper part	12,0 l/s	10,2 l/s	12,6 l/s	7,6 l/s	16,4 l/s
DN 125	90°	With upper part	12,0 l/s	10,0 l/s	12,6 l/s	7,6 l/s	16,4 l/s

DN 150

			Ball grating	Flat grating	Top section	Cast iron top section	Top frame with grating
Nominal width	**Inclination**	**Model**	**Article No. 7000.10.00**	**Article No. 7000.20.00**	**Article No. 7000.40.00**	**Article No. 7000.28.00**	**Article No. 7000.41.00 7000.42.00**
DN 150	1,5°	Without upper part	14,5 l/s	12,6 l/s	15,0 l/s	7,6 l/s	21,2 l/s
DN 150	1,5°	With upper part	14,5 l/s	12,6 l/s	15,0 l/s	7,6 l/s	21,2 l/s
DN 150	90°	Without upper part	13,5 l/s	11,0 l/s	15,0 l/s	7,6 l/s	18,5 l/s
DN 150	90°	With upper part	13,5 l/s	11,0 l/s	15,0 l/s	7,6 l/s	18,5 l/s

Cast iron with fire protection insert

DN 100

Nominal width	Inclination	Model	Ball grating Article No. 7000.10.00	Flat grating Article No. 7000.20.00	Top frame with grating Article No. 7000.40.00	Top frame with grating Article No. 7000.28.00	Top frame with grating Article No. 7000.41.00 7000.42.00
DN 100	90°	Without upper part	7,4 l/s	7,3 l/s	8,9 l/s	6,8 l/s	11,8 l/s
DN 100	90°	With upper part	7,4 l/s	7,0 l/s	8,5 l/s	6,5 l/s	11,8 l/s

Stainless Steel

DN 70

Nominal width	Inclination	Model	Plastic gravel basket Article No. 0174.46.66	Stainless steel gravel basket Article No. 0174.46.59 0174.46.62
DN 70	1,5°	Without upper part	2,6 l/s	2,7 l/s
DN 70	1,5°	With upper part	2,8 l/s	3,0 l/s
DN 70	90°	Without upper part	2,5 l/s	2,6 l/s
DN 70	90°	With upper part	2,7 l/s	2,8 l/s

DN 100

Nominal width	Inclination	Model	Plastic gravel basket Article No. 0174.46.66	Stainless steel gravel basket Article No. 0174.46.59 0174.46.62
DN 100	1,5°	Without upper part	5,0 l/s	5,9 l/s
DN 100	1,5°	With upper part	4,7 l/s	5,3 l/s
DN 100	90°	Without upper part	4,7 l/s	5,6 l/s
DN 100	90°	With upper part	5,1 l/s	5,7 l/s

DN 125

Nominal width	Inclination	Model	Plastic gravel basket Article No. 0174.46.66	Stainless steel gravel basket Article No. 0174.46.59 0174.46.62
DN 125	1,5°	Without upper part	8,3 l/s	9,9 l/s
DN 125	1,5°	With upper part	8,7 l/s	8,9 l/s
DN 125	90°	Without upper part	8,5 l/s	8,4 l/s
DN 125	90°	With upper part	8,5 l/s	8,4 l/s

Stainless steel with fire protection insert

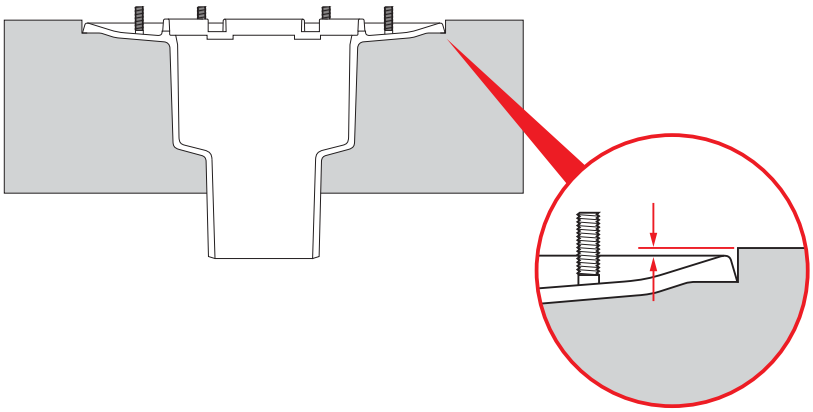
DN 100

Nominal width	Inclination	Model	Plastic gravel basket Article No. 0174.46.66	Stainless steel gravel basket Article No. 0174.46.59 0174.46.62
DN 100	90°	Without upper part	4,7 l/s	4,7 l/s
DN 100	90°	With upper part	4,7 l/s	4,7 l/s

Installation

ACO Spin flat roof drain made of cast iron

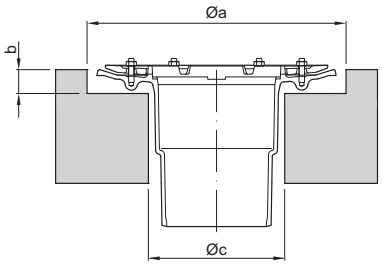
Concrete roof: Pouring in
Flat roof drains can be installed on site when the concrete is poured in. Caution: Ensure that the fixed flange is positioned slightly below the top surface of the concrete because a gradient towards the drain body must be created when the sealing membrane is installed.



Concrete roof: Core boreholes
Core boreholes with two different diameters and two different heights have to be cut to install the flat roof drains.

- Ø a x b: core borehole dimensions for the flange (flange support)
- Ø c: core borehole dimension for the drain body

The core hole for the flange support must be cut to enable the sealing membrane to be laid towards the drain body with a gradient as stipulated in DIN EN 18195. Each of the product pages contains the dimensions of the core boreholes required for the product.



Trapezoidal sheet metal roof
Cast iron drains cannot be installed directly onto a trapezoidal sheet metal roof. A mounting plate* is required.

The matching insulating mounting for the flat roof drain must also be installed in the mounting plate to ensure that the drain body is perfectly positioned on the mounting plate.

The mounting plate and the trapezoidal sheet roofing must be connected pursuant to DIN 18807. The mounting plate must be connected to the trapezoidal sheet roof as follows:

- Two connecting elements on the transverse side in the top beam
- One connecting element next to every covered gutter
- Connecting elements on the longitudinal edge, separation: 120 mm

Caution: Every hole cut in the trapezoidal roof reduces its load-bearing capacity. Verification of the load-bearing capacity of the combined mounting plate and trapezoidal sheet roof can only be issued by a structural engineer.

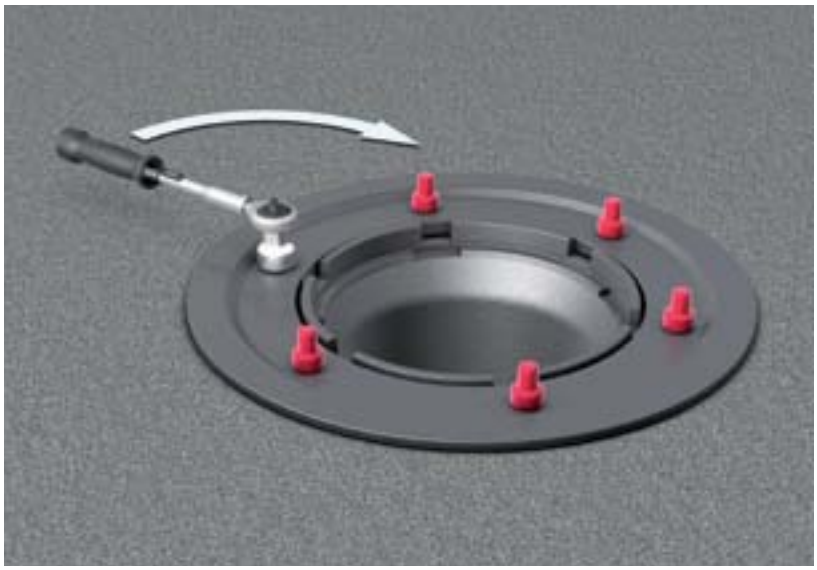
*Covecta, Deggingen, supplies mounting plates for all standard ACO flat roof drains.
Tel. +49 (0) 7334 8012, Fax +49 (0) 7334 4323

Heating
Flat roof drains can also be installed with auxiliary heating to prevent the drain from freezing. To reduce energy consumption to a minimum, it is recommended that the heated drains be controlled by an additional thermostat. Installation of an FI switch (30 mA) is recommended. When Spin two-piece cast iron flat roof drains are installed, the heating is always installed on the drain body (below the lower sealing level).

2-piece Spin flat roof drain with heating (Article No. 7000.85.00) and thermostat (not supplied)

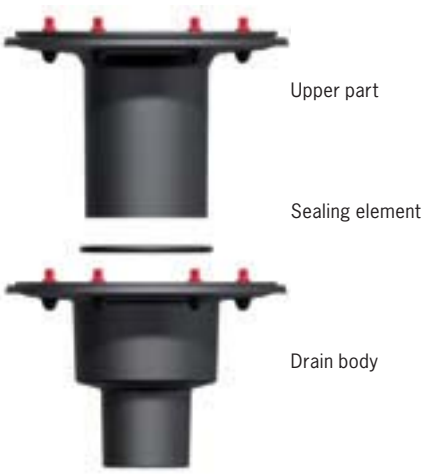
Installing the sealing membrane
Bitumen membranes as well as high polymer sealing membranes can be connected to the Spin cast iron flat roof drains by the compression sealing flange.
One spacer below and one spacer above the sealing membrane must be put into place when connecting thin high polymer sea-ling membranes to the compression sea-ling flange. These spacers ensure that any unevenness in the fixed and loose flanges on the drain are compensated for to ensure that a watertight seal is created when the flanges are tightened up. The spacers can also be made on site from spare material from the same sealing membrane.

After placing the loose flange on top, the nuts must be tightened up one after the other with a torque.



Using the extension element (= top section)
DIN 1986-100, Chapter 5.7.3.1 stipulates that in the case of two-piece flat roof drains, there must be a tight seal between the drain body and the top section. This ensures that the thermal insulation is not damaged by rainwater in the event that wastewater backflows up the pipe.

The upper parts for cast iron flat roof drains are always supplied as standard with a sealing ring. This is installed between the drain body and the upper part.



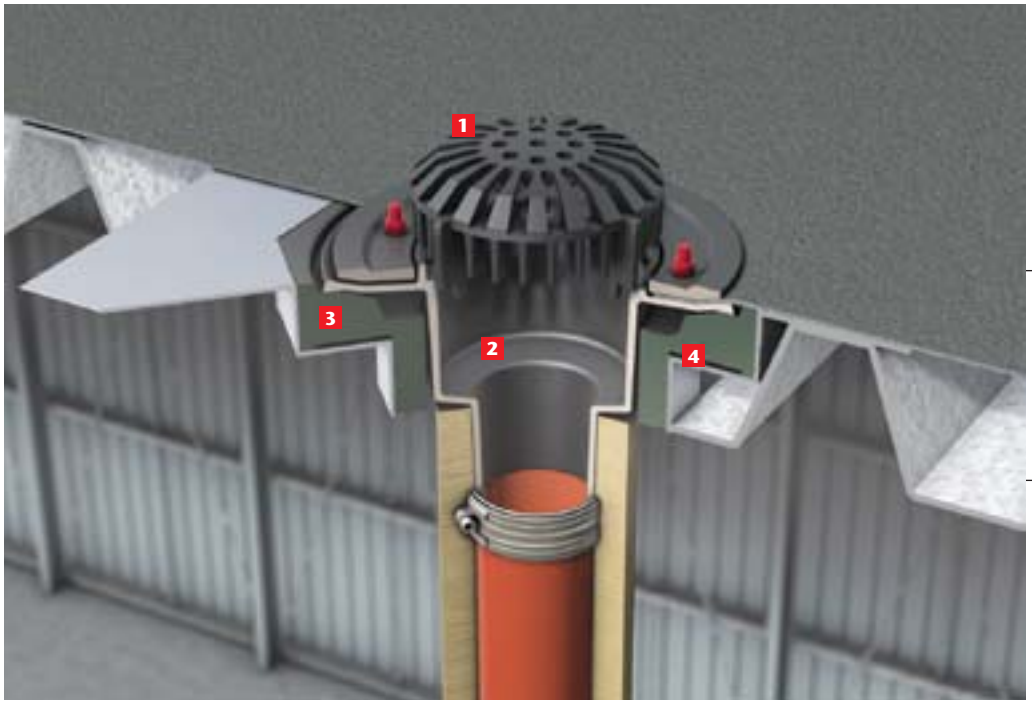
Pipe connections

ACO Spin flat roof drains made of cast iron

Pipe type	With transition elements	Suitable for connection to
DN 70		
GM-X pipe with coupling socket	CV connector transition 0174.14.26	Spin flat roof drain made of cast iron DN 70
Spigot pipe with no coupling socket	CV connector DN 70	
HT pipe with coupling socket	HT/spigot pipe connector DN70/DN70	
DN 100		
GM-X pipe with coupling socket	CV connector DN 100	Spin flat roof drain made of cast iron DN 100
Spigot pipe with no coupling socket	transition 0174.14.27	
HT pipe with coupling socket	CV connector DN 100	
DN 125		
GM-X pipe with coupling socket	Direct connection	Spin flat roof drain made of cast iron DN 125
Spigot pipe with no coupling socket	CV connector DN 125	
HT pipe with coupling socket	HT-spigot pipe connector DN 125/DN 125	
DN 150		
GM-X pipe with coupling socket	Direct connection	Spin flat roof drain made of cast iron DN 150
Spigot pipe with no coupling socket	CV connector DN 150	
HT pipe with coupling socket	HT-spigot pipe connector DN 150/DN 150	

Installation example trapezoidal sheet metal roof

Gravity drainage with ACO Spin flat roof drain made of cast iron

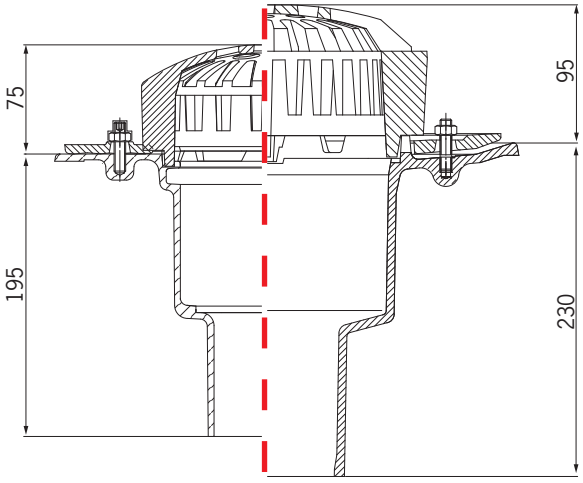


1 **Ball grating**
Article No. 7000.10.00

2 **Cast iron flat roof drain**
DN 100, 90 °
Article No. 7034.10.10

3 **Insulating mounting**
Article No. 7040.21.00

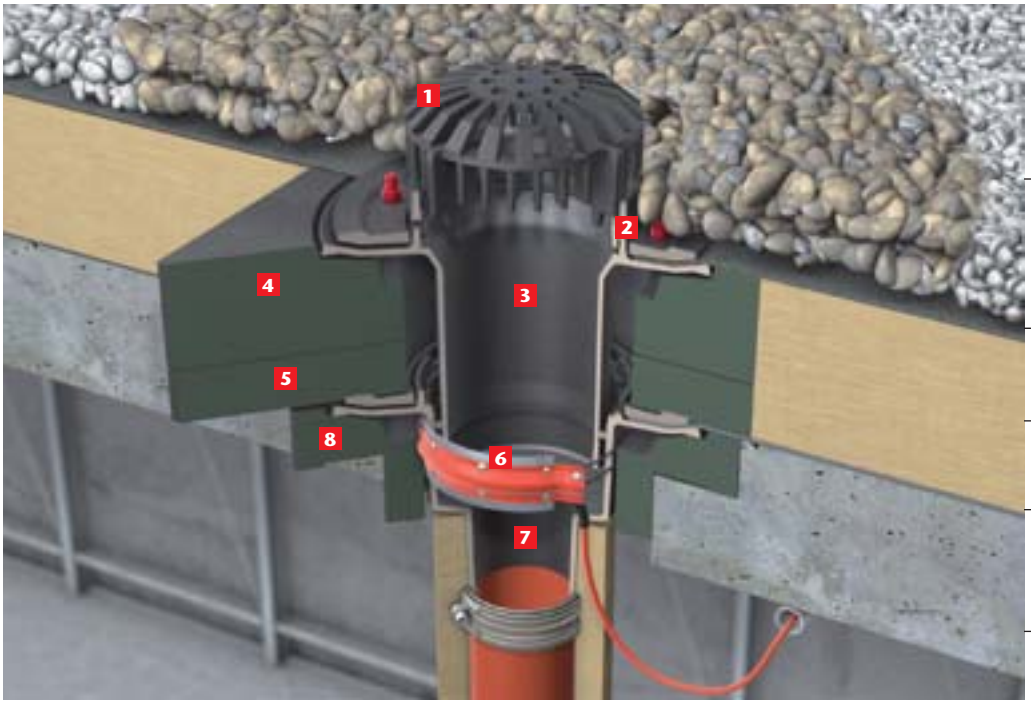
4 **Mounting sheet**
Delivery details:
Covecta Vertrieb
Burgsteige 35
73326 Deggingen
Germany
Tel. +49 (0) 7334 8012

DN 70	DN 100–DN 150
	
The outlet socket of the drain body can be shortened on site by max. 44 mm.	The outlet socket of the drain body can be shortened on site by max. 35 mm.

Extension heights in mm

Installation example in a warm roof

Gravity drainage with ACO Spin flat roof drain made of cast iron



- Gravel layer
- Sealing membrane
- Insulation
- Sealing membrane (vapour seal)
- Ceiling (thickness according to the structural engineering specifications)

1 Ball grating
Article No. 7000.10.00

2 Top ring
Article No. 7000.35.00

3 Upper part
Article No. 7044.10.25

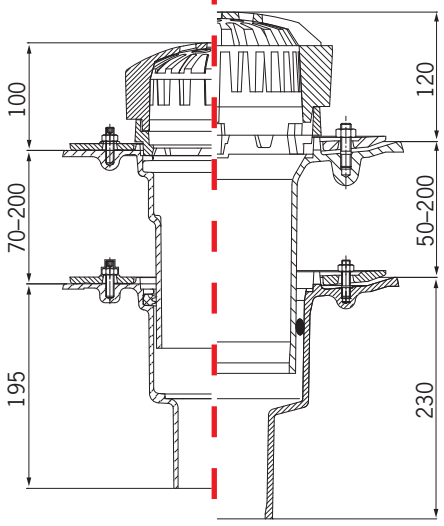
4 Insulating ring
Article No. 7040.11.00

5 Levelling element
Article No. 7040.01.00

6 Heating
Article No. 7000.85.00

7 Cast iron flat roof drain
DN 100, 90°
Article No. 7034.10.10

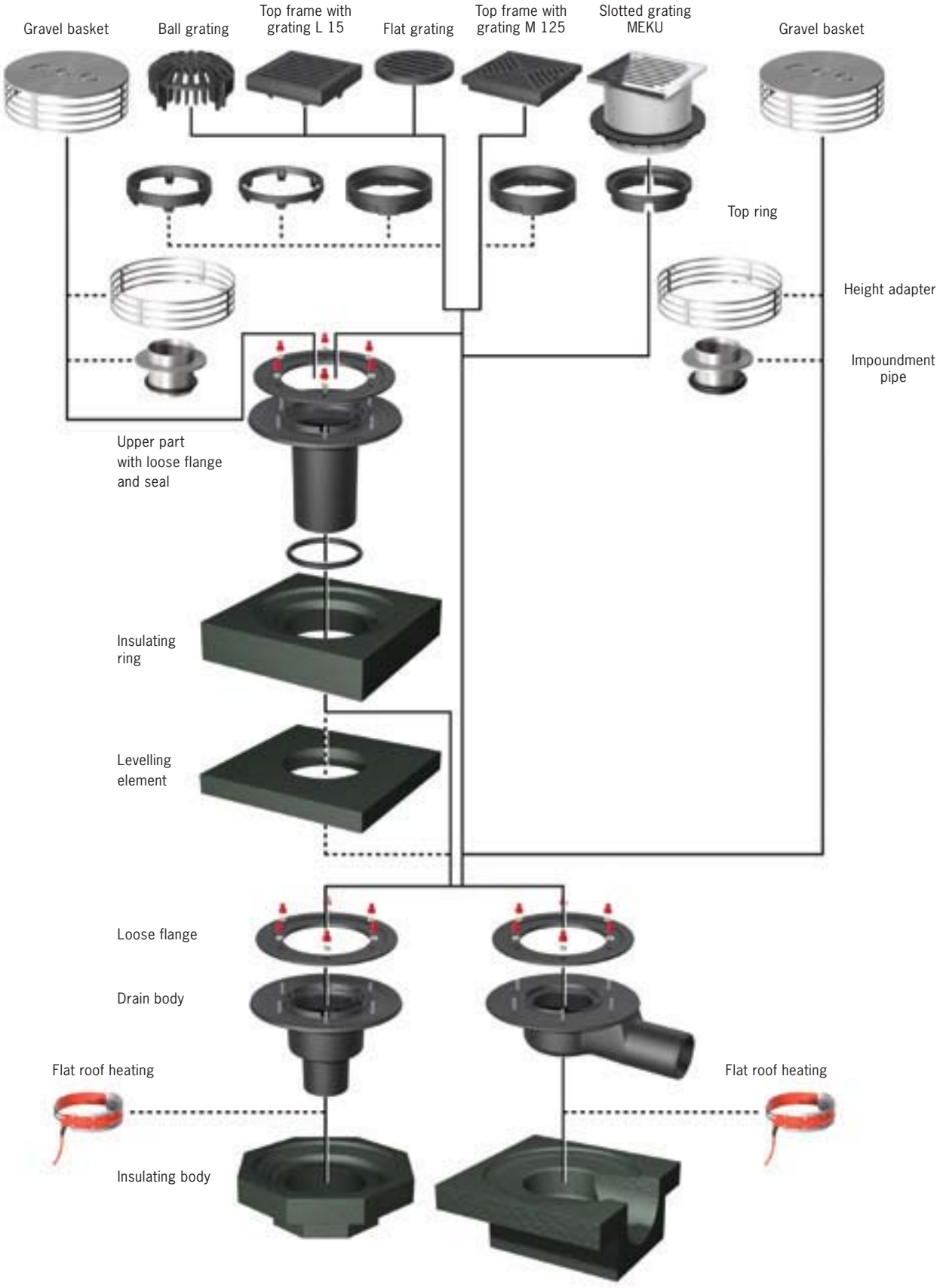
8 Insulating mounting
Article No. 7040.21.00

DN 70	DN 100–DN 150
	
The outlet socket of the drain body can be shortened on site by max. 44 mm.	The outlet socket of the drain body can be shortened on site by max. 35 mm.

Extension heights in mm

Modular system

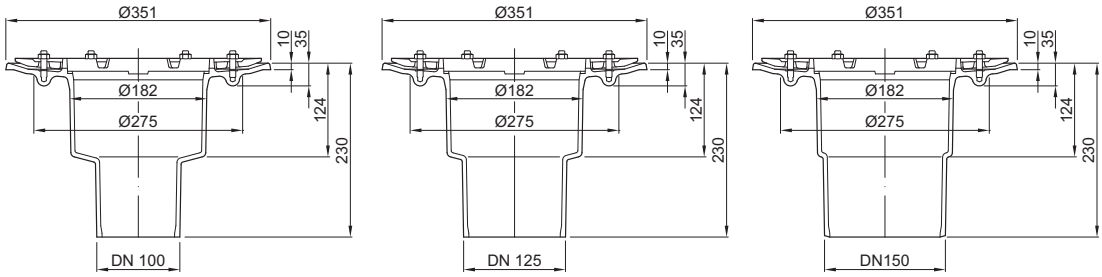
ACO Spin flat roof drain DN 100 – DN 150 made of cast iron for gravity drainage



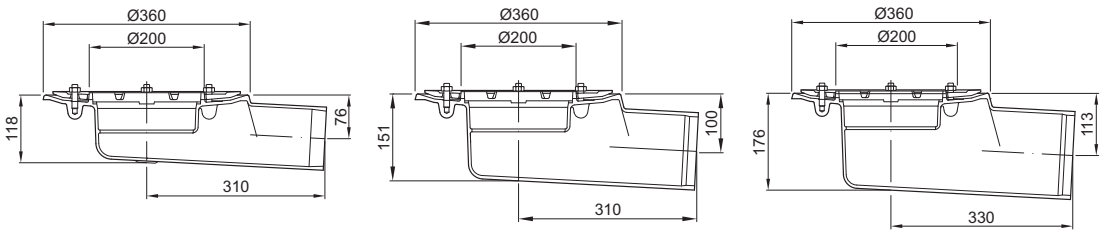
ACO Spin flat roof drain made of cast iron

DN 100 – DN 150

- Drain body DN 100 – DN 150 pursuant to DIN EN 1253
- Cast iron, construction material class A1, coated
- With compression sealing flange and seepage openings
- Can be connected to spigot pipe pursuant to DIN 19522 / DIN EN 877



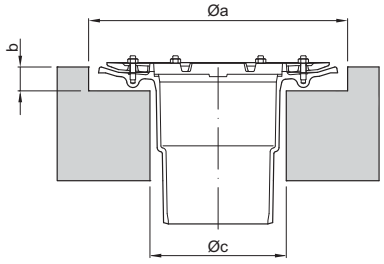
With vertical outlet socket			
Nominal width	DN 100	DN 125	DN 150
Weight	13,1 kg	13,6 kg	14,4 kg
Article No.	**7034.10.10**	**7035.10.10**	**7036.10.10**



With horizontal outlet socket			
Nominal width	DN 100	DN 125	DN 150
Weight	15,2 kg	15,7 kg	18,2 kg
Article No.	**7054.11.10**	**7055.11.10**	**7056.11.10**

Core borehole dimensions

Nominal width	Ø a	Ø c	b [mm]	Article No.
For drain body without insulating body				
DN 100	380	200	35	**7034.10.10**
DN 125	380	200	35	**7035.10.10**
DN 150	380	200	35	**7036.10.10**
For drain body with insulating body				
DN 100	430	270	65	**7034.10.10**
DN 125	430	270	65	**7035.10.10**
DN 150	430	270	65	**7036.10.10**

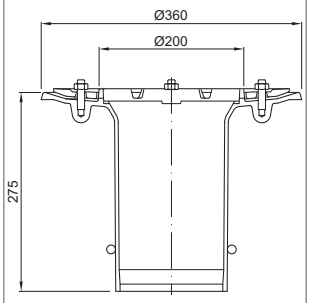
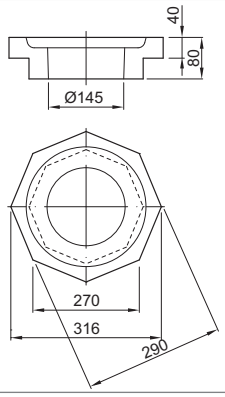
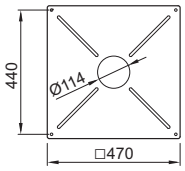
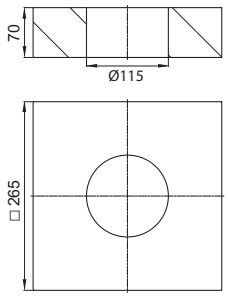
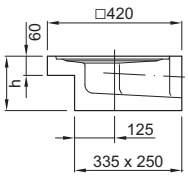


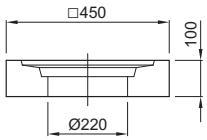
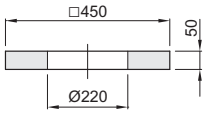
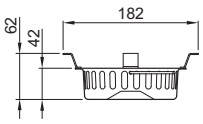
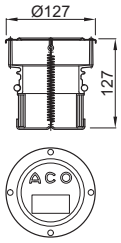
Recess dimensions

Nominal width	Type	Outlet inclination	Article No.	Recess dimensions Drain body without insulating body	Recess dimensions Drain body with insulating body
DN 100	Spin	1,5°	**7054.11.10**	290 x 670 mm	500 x 670 mm
DN 125	Spin	1,5°	**7055.11.10**	290 x 700 mm	500 x 700 mm
DN 150	Spin	1,5°	**7056.11.10**	290 x 750 mm	500 x 750 mm
DN 100	Spin	90°	**7034.10.10**	290 x 410 mm	450 x 450 mm
DN 125	Spin	90°	**7035.10.10**	290 x 410 mm	450 x 450 mm
DN 150	Spin	90°	**7036.10.10**	290 x 410 mm	450 x 450 mm

Additional components

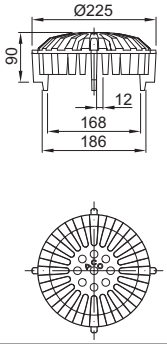
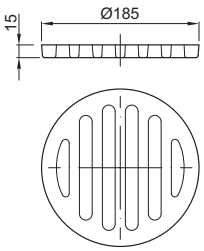
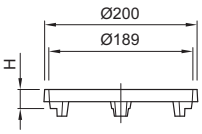
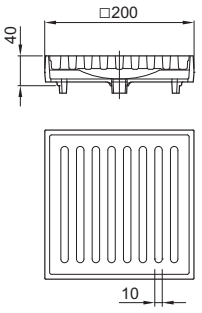
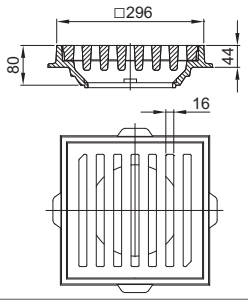
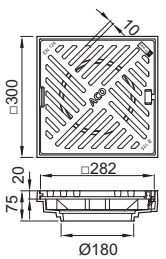
ACO Spin flat roof drain DN 100 – DN 150 made of cast iron

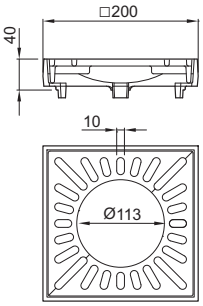
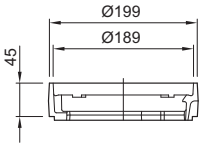
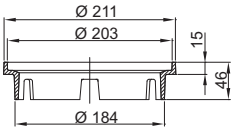
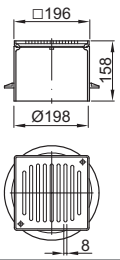
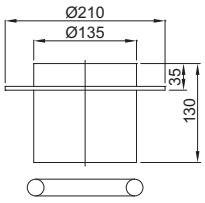
	Scale drawing	Product description	Model	Article No.
		**Upper part** cast iron, DN 100-DN 150 for sealing with two sealing membranes, with compression sealing flange, seepage openings and sealing ring	Coated	**7044.10.25**
		**Insulating body** for flat roof drain with vertical outlet socket, foam glass		**7040.21.00**
		**Heat shield** with impact dowels M 8 x 16 for Spin flat roof drain DN 100 made of cast iron or stainless steel with insulation and fire protection		**7034.20.17**
		**Isolating plate** foam glass 265 x 265 mm for Spin flat roof drain DN 100 – DN 150 made of cast iron with insulation and fire protection		**7040.23.00**
		**Insulating body** for flat roof drain with horizontal outlet socket, foam glass	DN 100, height: 170 mm DN 125, height: 215 mm DN 150, Höhe: 240 mm height	**7040.31.00** **7040.32.00** **7040.33.00**

	Scale drawing	Product description	Model	Article No.
		**Insulating ring** for flat roof drain upper part DN 100 – DN 150, foam glass		**7040.11.00**
		**levelling element** for flat roof upper part DN 100 – DN 150, foam glass		**7040.01.00**
		**Bucket** stainless steel, material 1.4301, fits flat roof drain DN 100 – DN 150 made of cast iron		**7000.13.00**
		**Flat roof heating** Suitable for all flat roof drains DN 50 – DN 150, Electrical supply: 220-240 V AC, Nominal power: 25 W, Protection class: I, Protection type: IP 67, Connecting cable: SIHF 3 x 1 mm², 1.5 m G 1.5		**7000.85.00**
		**Fire protection insert** fits Spin flat roof drain DN 100 with 90° outlet inclination. Warning! Outflow performance reduced by the insert! (refer to page 15)		**7034.20.15**

Top sections, gratings and top frames

ACO Spin flat roof drains DN 100 – DN 150 made of cast iron

	Scale drawing	Product description	Model	Article No.
		**Ball grating** cast iron, fits all Spin flat roof drains DN 100 – DN 150, external dimensions: Ø 225 mm	Class H1,5	**7000.10.00**
		**Flat grating** cast iron, fits all Spin flat roof drains DN 100 – DN 150, external dimensions: Ø 185 mm	Class L15	**7000.20.00**
		**Top ring** cast iron, fits Article Nos. 7000.10.00, 7000.20.00, 7000.39.00 and 7000.40.00	Height: 25 mm Height: 35 mm	**7000.25.00** **7000.35.00**
		**Top frame** cast iron, with slotted grating Frame dimensions: □ 200 x 200 mm	Class L15	**7000.40.00**
		**Top frame** cast iron, with slotted grating Frame dimensions: □ 296 mm	unbolted bolted	**7000.41.00** **7000.42.00**
		**Top frame** with boltless locking, cast iron, with slotted grating Frame dimensions: □ 300 x 300 mm	Class M125, bolted	**7000.46.00**

	Scale drawing	Product description	Model	Article No.
		**Top frame** cast iron, with slotted grating, Frame dimensions: ☐ 200 x 200 mm	Class L15	**7000.39.00**
		**Top ring** cast iron, fits Article No. 7000.46.00 7000.28.00 7000.41.00 7000.42.00		**7000.45.00**
		**Transition ring** cast iron, fits top section Article No. 5084.81.00 Build height: 24 mm		**7000.31.00**
		**MEKU top section** frame dimensions: ☐ 196 mm, plastic top section, frame and slotted grating made of stainless steel Transition ring required	Class K3, bolted	**5084.81.00**
		**Impoundment pipe** made of CrNi, material 1.4301, with a sealing ring for Spin flat roof drains made of cast iron	35 mm, DN 100, one-piece 35 mm, DN 100, two-piece 45 mm, DN 125/DN150, one-piece 45 mm, DN 125/150, two-piece	**7034.10.50** **7044.10.50** **7035.10.50** **7045.10.50**